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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,590	10/02/2003	Brett Spivey	503	8200

7590 04/24/2007

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EXAMINER	
LI, SHI K	
ART UNIT	**PAPER NUMBER**
2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/677,590	SPIVEY ET AL.	
	Examiner	Art Unit	
	Shi K. Li	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 February 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☒ Other: approved drawings

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 4-5 and 12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 4 recites the limitation "wherein said routing algorithm is an algorithm adapted to utilize a requirements matrix and an allocation matrix in order to assign wavelength communication channels to avoid collisions" in lines 2-4 of the claim. Instant specification, as originally filed, does not describe the limitation in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 5 recites the limitation "wherein the routing algorithm utilizes mathematical solutions similar to those used to solve magic squares mathematical puzzles" in lines 2-3 of the claim. Instant specification, as originally filed, does not describe the limitation in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 12 recites the limitation "seven optical subfrequency signals defining six wavelength communication channels" in lines 3-4 of the claim. Instant specification, as

originally filed, does not describe the limitation in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 25 recites the limitation "seven optical subfrequency signals defining six wavelength communication channels" in lines 3-4 of the claim. Instant specification, as originally filed, does not describe the limitation in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 5, 12-13 and 25-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Regarding claim 5, the phrase "similar" in line 2 of the claim renders the claim indefinite because neither the claim nor instant specification clearly define the similarity between said routing algorithm and the algorithm for solving magic squares mathematical puzzles.

6. Claim 12 recites the limitation "seven optical subfrequency signals defining six wavelength communication channels" in lines 3-4 of the claim. It is unclear whether each narrowband optical reference frequency signals is associated with seven or six wavelength communication channels.

7. Claim 25 recites the limitation "seven optical subfrequency signals defining six wavelength communication channels" in lines 3-4 of the claim. It is unclear whether each narrowband optical reference frequency signals is associated with seven or six wavelength communication channels.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 1-2, 6-8, 14-21 and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al. (U.S. Patent Application Pub. 2005/0071484 A1) in view of Hoang et al. (U.S. Patent Application Pub. 2004/0246896 A1), Yamada et al. (E. Yamada et al., "106 Channelx10 Gbit/s, 640 Km DWDM Transmission with 25 GHz Spacing with Supercontinuum Multi-Carrier Source", Electronics Letters, Vol. 37, No. 25, 6th December 2001) and Sirat et al. (U.S. Patent Application Pub. 2004/0208644 A1).

Regarding claims 1 and 17-18, Kang et al. discloses in FIG. 16 a large WDM mesh network with 28 nodes. Kang et al. suggests in paragraph [0009] using fiber for connecting the nodes. Kang et al. teaches in paragraph [0067] capacity allocation algorithm. The differences between Kang et al. and the claimed invention are (a) Kang et al. does not teach explicitly that the algorithm is executed by processor, (b) Kang et al. does not teach optical signal generator and (c) Kang does not teach tunable filters. Hoang et al. teaches setting up lightpath in an optical network. Hoang et al. teaches in paragraph [0011] that a lightpath is a path in an optical network for which the lambda (i.e., wavelength) does not change. Hoang et al. teaches in paragraph [0013] that an optical network device (i.e., a node) contains optical crossconnect and microprocessor for controlling the crossconnect and executing software such as routing algorithms. One of ordinary skill in the art would have been motivated to combine the teaching of Hoang et al. with the WDM mesh network of Kang et al. because a microprocessor can performs huge number of calculation and is suitable for executing algorithms. Thus it would

have been obvious to one of ordinary skill in the art at the time the invention was made to use a processor for executing algorithms, as taught by Hoang et al., in the WDM mesh network of Kang et al. because a microprocessor can performs huge number of calculation and is suitable for executing algorithms.

The combination of Kang et al. and Hoang et al. still fails to teach optical signal generator. Yamada et al. teaches in FIG. 1 a DWDM transmission system including a supercontinuum (SC) multi-carrier light source that generates 106 wavelengths. One of ordinary skill in the art would have been motivated to combine the teaching of Yamada et al. with the modified WDM mesh network of Kang et al. and Hoang et al. because the SC light source generates large number of wavelengths with uniform channel spacing. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a SC multi-carrier light source, as taught by Yamada et al., in the modified WDM mesh network of Kang et al. and Hoang et al. because the SC light source generates large number of wavelengths with uniform channel spacing.

Kang et al., Hoang et al. and Yamada et al. have been discussed above. The difference between Kang et al., Hoang et al. and Yamada et al. and the claimed invention is that Kang et al., Hoang et al. and Yamada et al. do not teach tunable filter and electo-optical modulators. Sirat et al. teaches in FIG. 1 to split and shift a carrier wavelength for generating sub-carriers and modulate each sub-carrier with user data. Sirat et al. teaches in paragraph [0121] electo-optic modulators. Sirat et al. teaches in paragraph [0008] to use narrow-band tunable filter for separating desirable wavelength channel from other channels. One of ordinary skill in the art would have been motivated to combine the teaching of Sirat et al. with the modified WDM mesh

network of Kang et al., Hoang et al. and Yamada et al. because a tunable filter can be tuned to receive different channels at different time and facilitates dynamic lightpath setup. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use narrow-band tunable filter for separating desirable wavelength channel from other channels, as taught by Sirat et al., in the modified WDM mesh network of Kang et al., Hoang et al. and Yamada et al. because a tunable filter can be tuned to receive different channels at different time and facilitates dynamic lightpath setup.

Regarding claim 2, Sirat et al. teaches in FIG. 1 that each radiation source can be split and shifted into four (4) sub-channels. This gives a total of 424 channels.

Regarding claims 6 and 19, Sirat et al. teaches in paragraph [0008] detectors.

Regarding claims 7-8 and 20-21, Sirat et al. teaches in paragraph [0124] bandwidth between 1 GHz and 10 GHz.

Regarding claim 14, it is well known in the art that the North America has more than 250 area codes. Kang et al. shows a simplified network representing the U.S. continent with 28 nodes. It is understood that the real network contains more than 28 nodes. It is also obvious to one of ordinary skill in the art to extend the network to have at least 250 area codes to cover the U.S. territory to provide a nation-wide communication network because the U.S. is a united country.

Regarding claims 15 and 27, Sirat et al. teaches in FIG. 1 that each radiation source can be split and shifted into at least four (4) sub-channels. This gives a total of 424 channels.

Regarding claims 16 and 28, Sirat et al. teaches in paragraph [0120] electro-optic modulator.

10. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al., Hoang et al., Yamada et al. and Sirat et al. as applied to claims 1-2, 6-8, 14-21 and 27-28 above, and further in view of Saniee et al. (U.S. Patent 7,058,296 B2).

Kang et al., Hoang et al., Yamada et al. and Sirat et al. have been discussed above in regard to claims 1-2, 6-8, 14-21 and 27-28. The difference between Kang et al., Hoang et al., Yamada et al. and Sirat et al. and the claimed invention is that Kang et al., Hoang et al., Yamada et al. and Sirat et al. do not teach requirements matrix and allocation matrix. However, the use of matrices for storing demands and allocation results are well known in the art. For example, Saniee et al. teaches in FIG. 2 a routing algorithm with demand matrix and wavelength channel assignment (equivalent to allocation matrix of instant claim). One of ordinary skill in the art would have been motivated to combine the teaching of Saniee et al. with the modified WDM network of Kang et al., Hoang et al., Yamada et al. and Sirat et al. because using matrix allows vector computation that handles multi-variables such as multiple nodes and multiple wavelengths. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use matrix notation in routing computation, as taught by Saniee et al., in the modified WDM network of Kang et al., Hoang et al., Yamada et al. and Sirat et al. because using matrix allows vector computation that handles multi-variables such as multiple nodes and multiple wavelengths.

Regarding claim 5, the algorithm of the modified WDM network of Kang et al., Hoang et al., Yamada et al., Sirat et al. and Saniee et al. is mathematically similar to those used to solve magic squares puzzles.

11. Claims 9-10 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al., Hoang et al., Yamada et al. and Sirat et al. as applied to claims 1-2, 6-8, 14-21 and 27-28 above, and further in view of Mahony et al. (2004/0165889 A1) or Wood (U.S. Patent 7,088,921 B1).

Kang et al., Hoang et al., Yamada et al. and Sirat et al. have been discussed above in regard to claims 1-2, 6-8, 14-21 and 27-28. The difference between Kang et al., Hoang et al., Yamada et al. and Sirat et al. and the claimed invention is that Kang et al., Hoang et al., Yamada et al. and Sirat et al. do not teach the user bandwidth. Mahony et al. teaches in FIG. 5 an access network for end users. FIG. 5 teaches that a feeder fiber (one wavelength) is connected to a power node which splits the signal into 4 for 4 ONUs and each ONU further splits signal into 8 service drops and CU cables for subtending splitters. Each subtending splitter splits signal into two. That is, a single wavelength supports around 4x8x2 = 64 users. As discussed above, Sirat et al. teaches in paragraph [0124] bandwidth between 1 GHz and 10 GHz for each wavelength channel. Therefore, each user can have a bandwidth of 15 to 150 MHz. Of course, the number of users varies from place to place. Also, users can pay higher service charge and get more bandwidth. As another example, Wood teaches in FIG. 2 an access network. Wood teaches that each user is connected to the network via a 10 or 100 MHz Ethernet connection. One of ordinary skill in the art would have been motivated to combine the teaching of Mahony et al. or Wood with the modified WDM network of Kang et al., Hoang et al., Yamada et al. and Sirat et al. to provide a reasonable amount of bandwidth to each user in the range of 10~150 MHz depending on the service fee and number of users in the area. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to allocate a bandwidth in the range of

10~150 MHz, as taught by Mahony et al. or Wood, in the modified WDM network of Kang et al., Hoang et al., Yamada et al. and Sirat et al.

12. Claims 11-13 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al., Hoang et al., Yamada et al. and Sirat et al. as applied to claims 1-2, 6-8, 14-21 and 27-28 above, and further in view of Mori et al. (K. Mori et al., "Supercontinuum Lightwave Source Generating 50 GHz Spaced Optical ITU Grid Seamlessly Over S-, C- and L-Bands", Electronics Letter, 20th March 2003).

Kang et al., Hoang et al., Yamada et al. and Sirat et al. have been discussed above in regard to claims 1-2, 6-8, 14-21 and 27-28. The difference between Kang et al., Hoang et al., Yamada et al. and Sirat et al. and the claimed invention is that Yamada et al. teaches a DWDM system of frequency spacing of 25 GHz instead of 50 GHz. Sirat et al. teaches in paragraph [0004] that a DWDM system can use either a 100 GHz spacing or 50 GHz or 25 GHz spacing. Mori et al. teaches in FIG. 1 a wavelength spectrum with 50 GHz over the S-, C- and L-band. This gives over 600 channels. One of ordinary skill in the art would have been motivated to combine the teaching of Mori et al. with the modified WDM network of Kang et al., Hoang et al., Yamada et al. and Sirat et al. because it provides more channels and, therefore, more bandwidth for communications. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to the supercontinuum source of Mori et al. for generating DWDM channels with 50 GHz spacing in the modified WDM network of Kang et al., Hoang et al., Yamada et al. and Sirat et al. because it provides more channels and, therefore, more bandwidth for communications.

Response to Arguments

13. Applicant's arguments with respect to claims 1-2 and 4-28 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

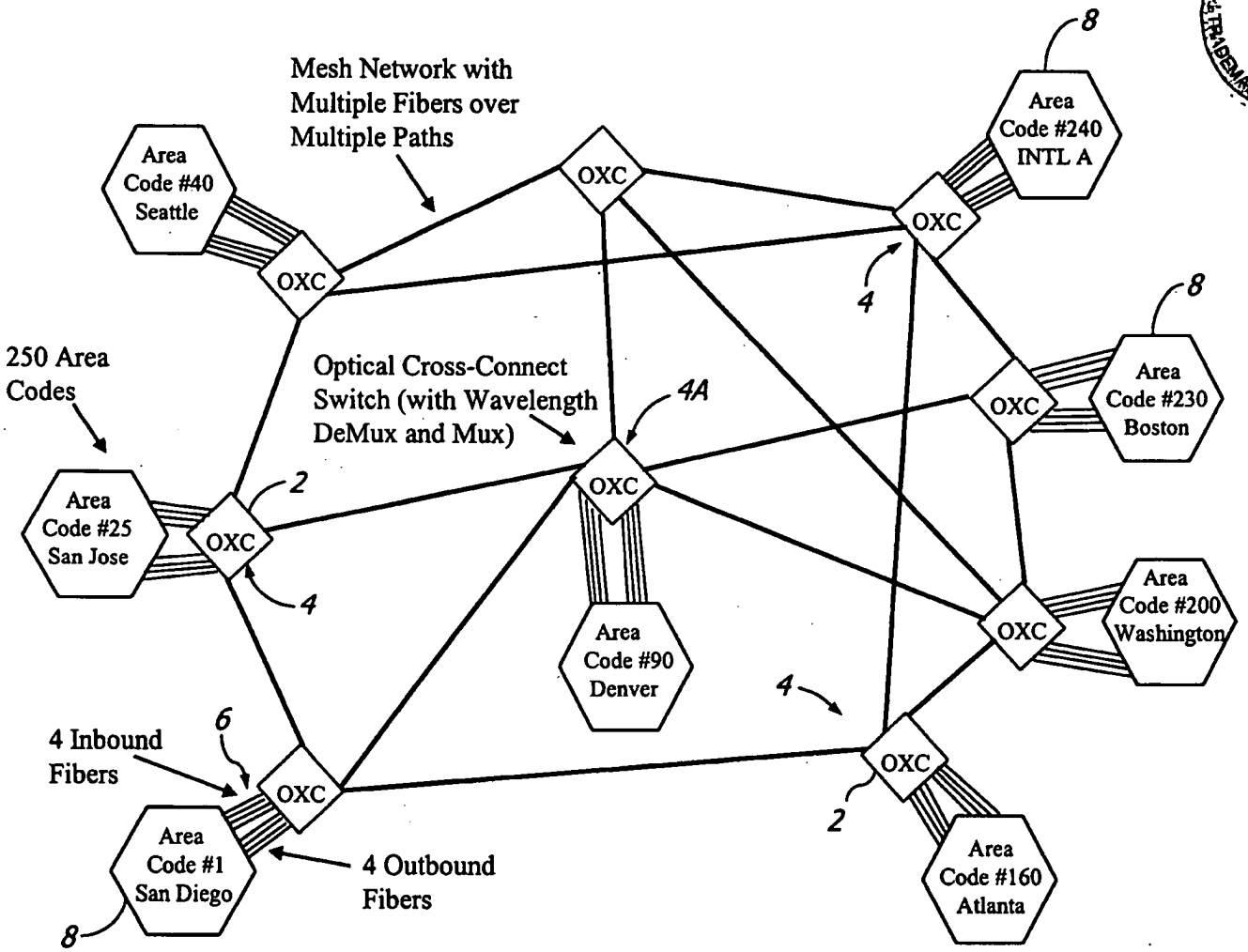
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 571 272-3031. The examiner can normally be reached on Monday-Friday (7:30 a.m. - 4:30 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

skl
17 April 2007

Shi K. Li
Primary Patent Examiner



4 Fibers x 300 Colors = 1200 FiberColors per Area Code
1200 FiberColors x 8.33 GHz /400,000 User Nodes = 25 MHz per User

FIG. 1

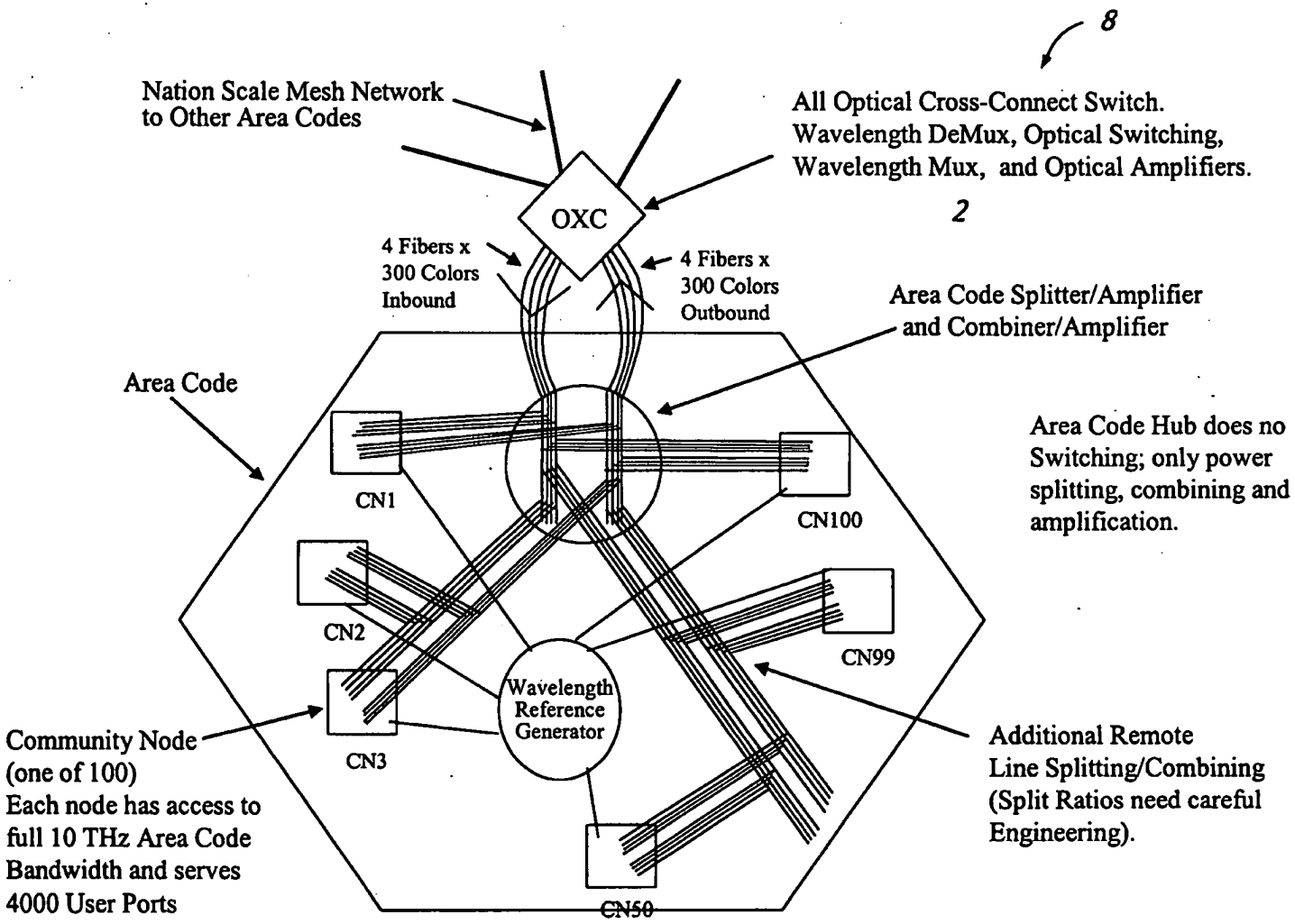


FIG. 2

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REPLACEMENT SHEET

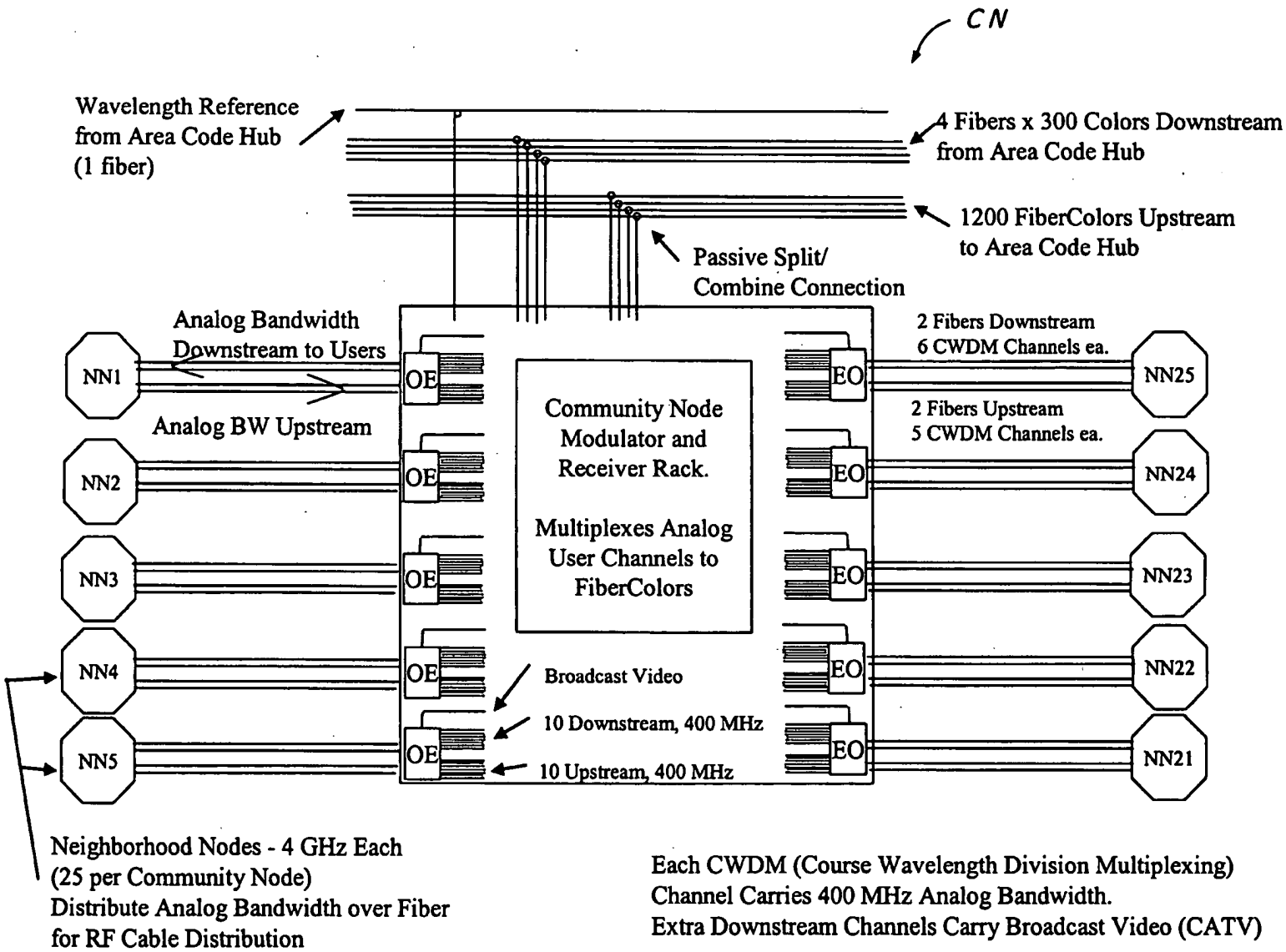

FIG. 3

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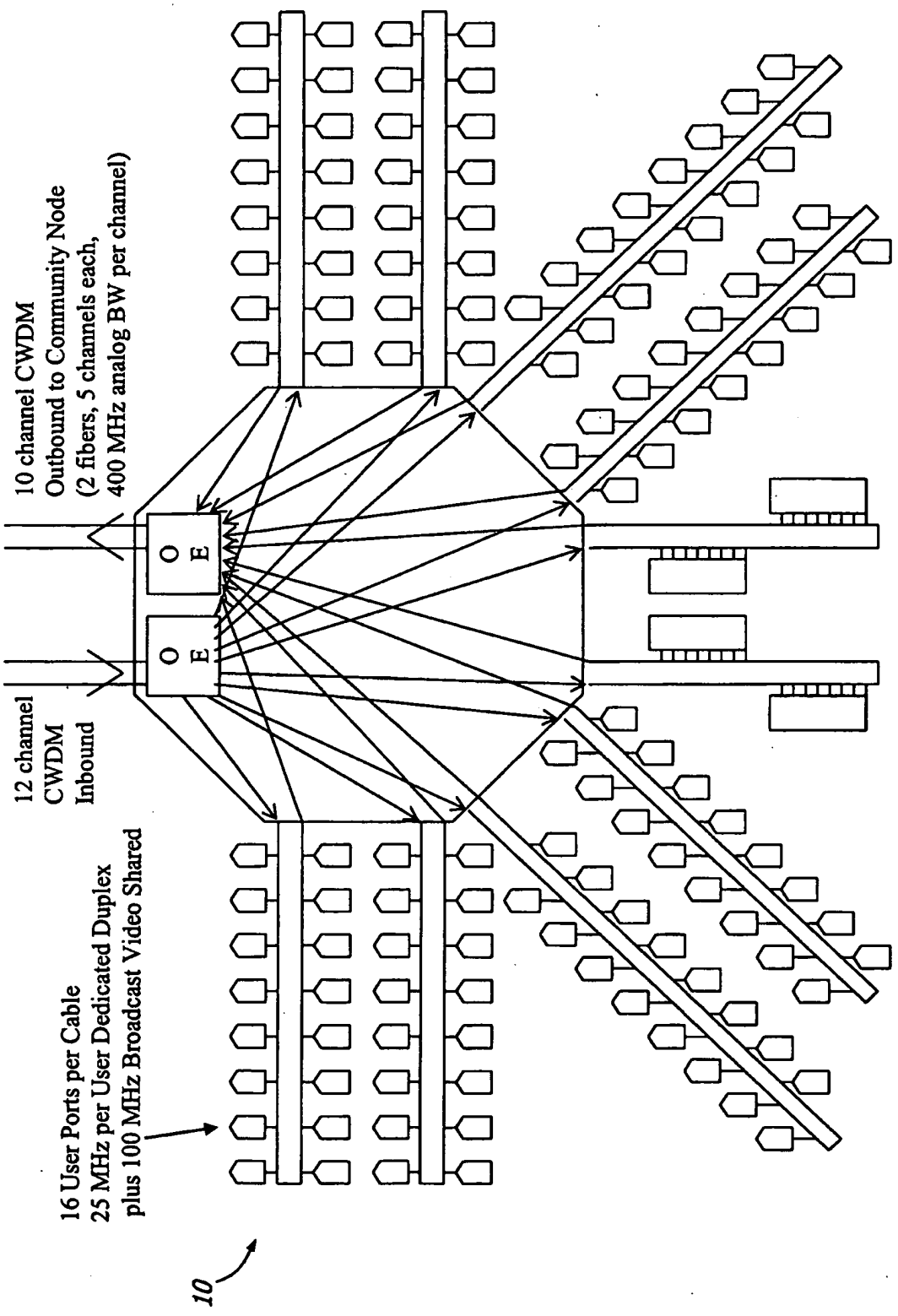

FIG. 4

- Accurate Laser Wavelength Comb Generated at Area Code Node
  - Or Regenerated from Central Network Reference Source
- Standard WDM 50 GHz spacings used, to allow straightforward wavelength demux and mux in network
- More accurate wavelength control (frequency to 500 MHz) used within area code.
- Source wavelengths either from multi-frequency fiber lasers, or from modulated DWDM lasers

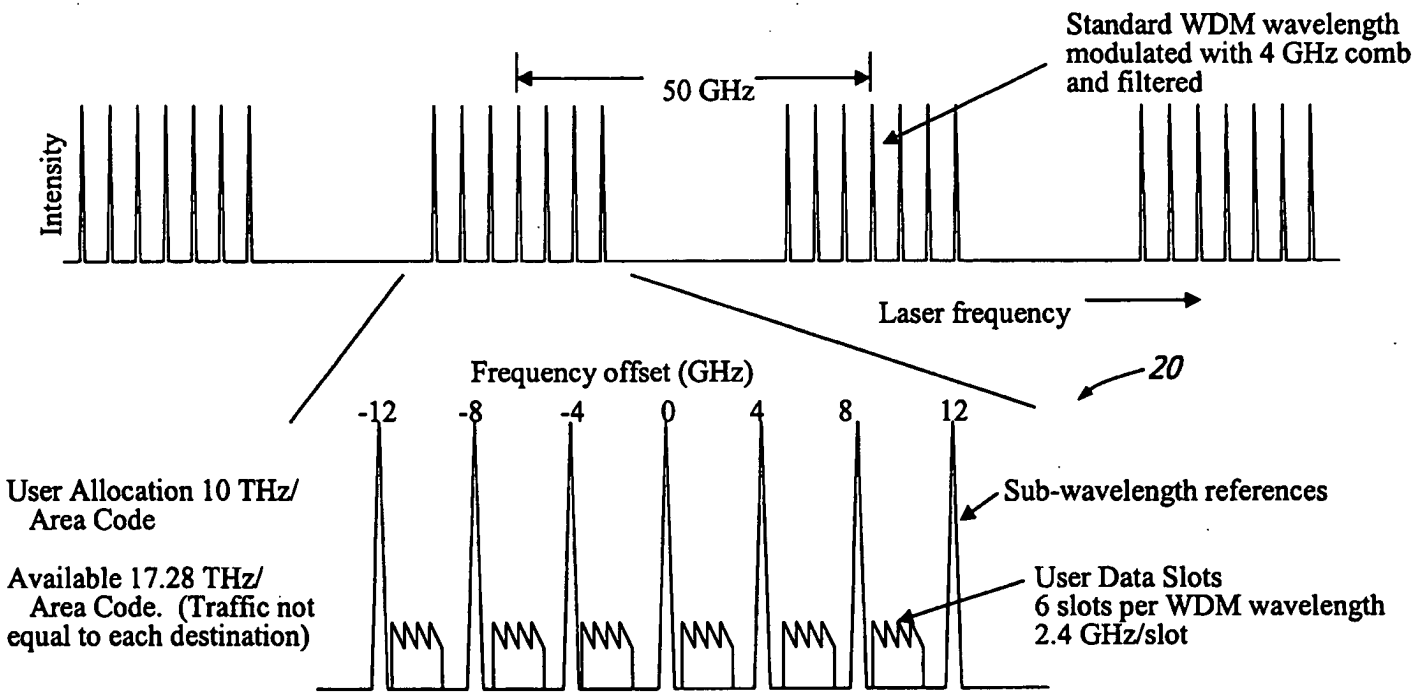

FIG. 5

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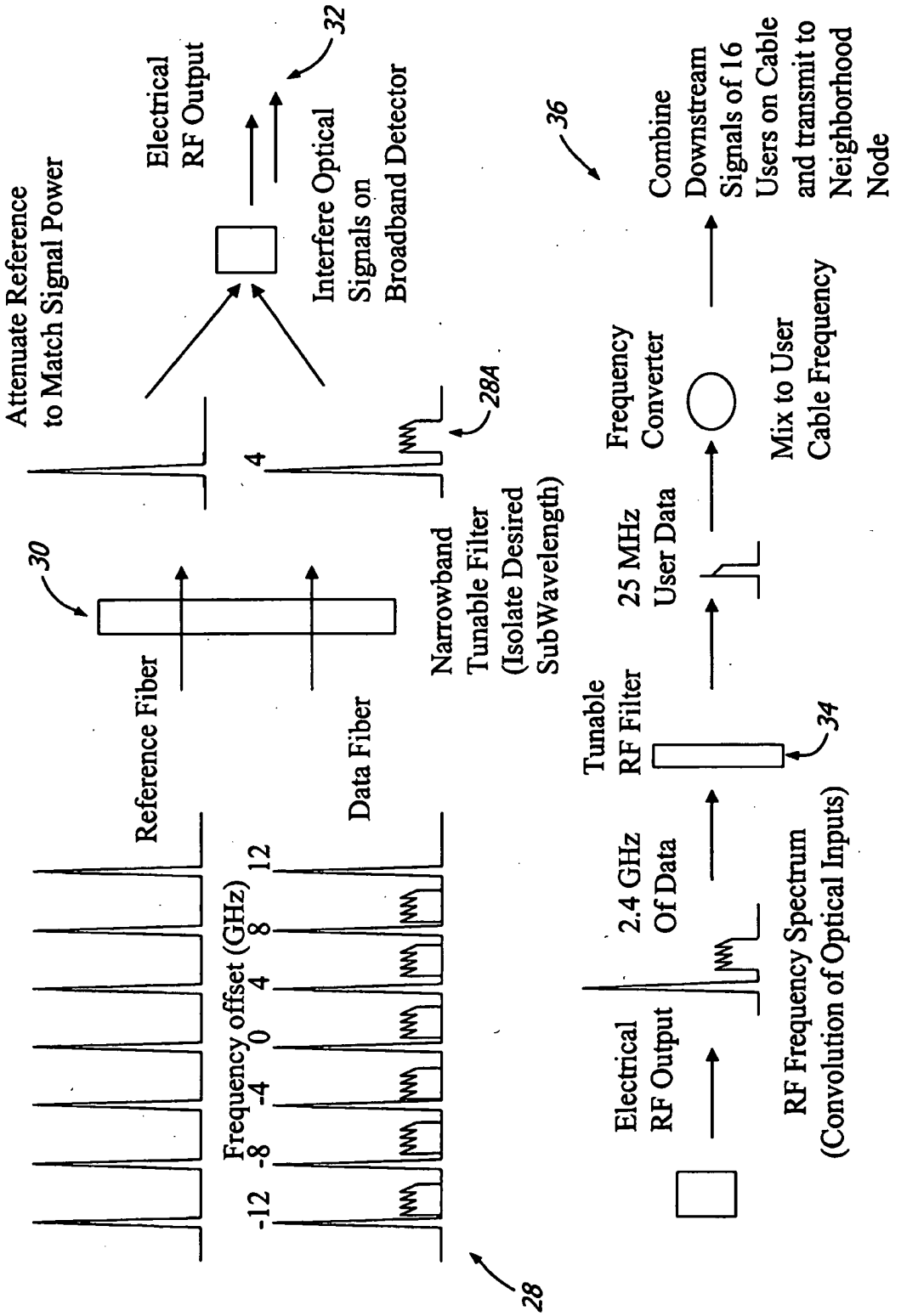

FIG. 6

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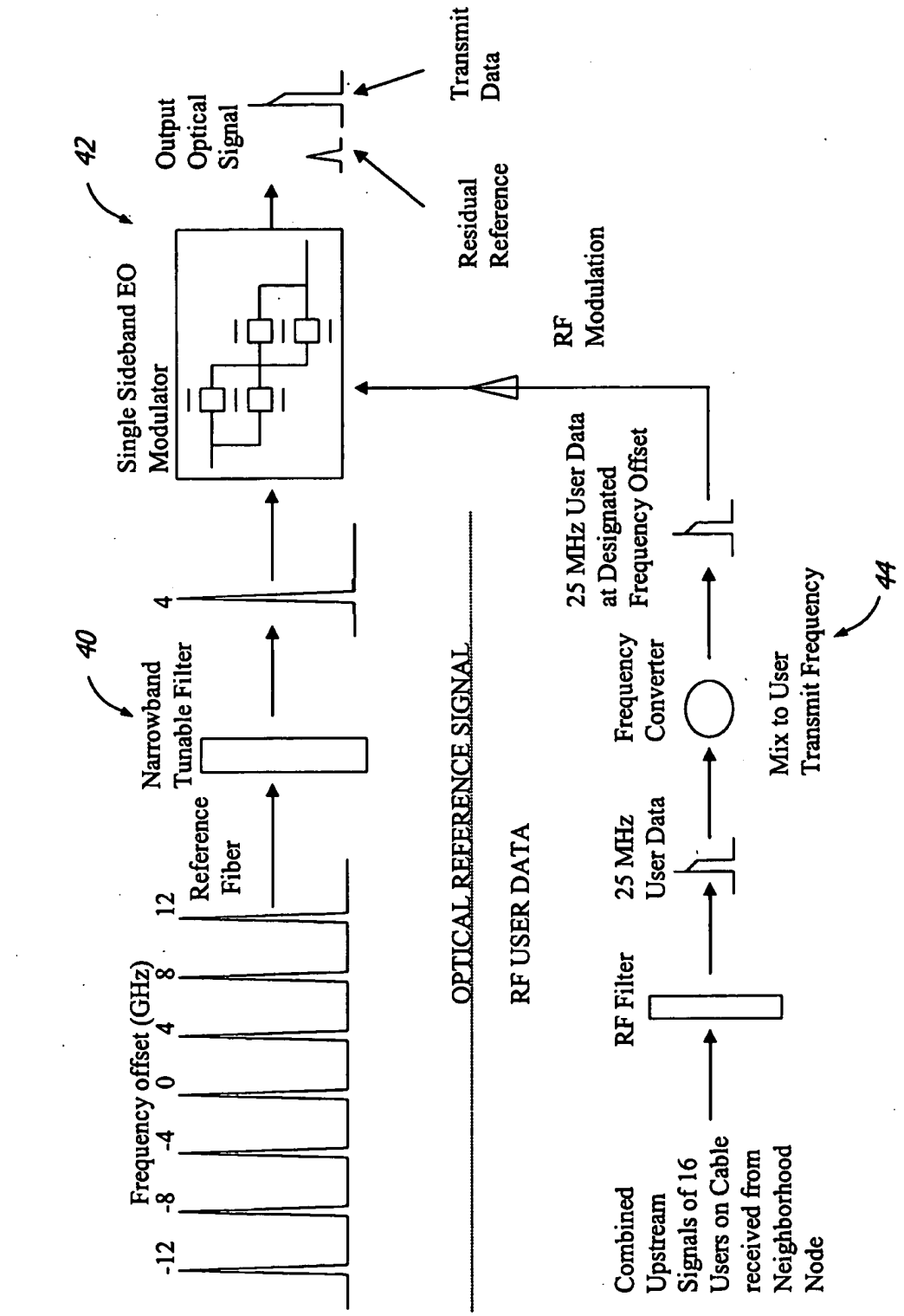

FIG. 7

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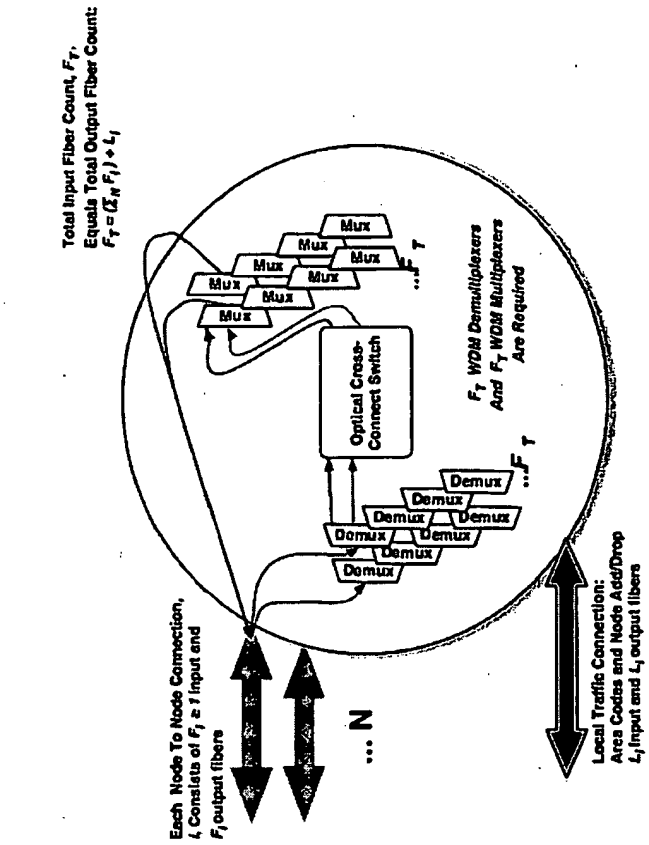

FIG. 9

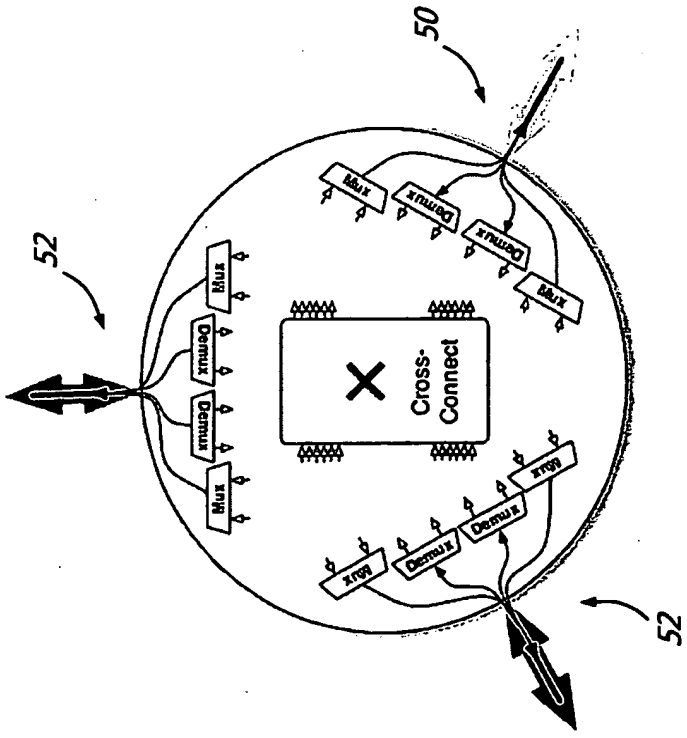

FIG. 8

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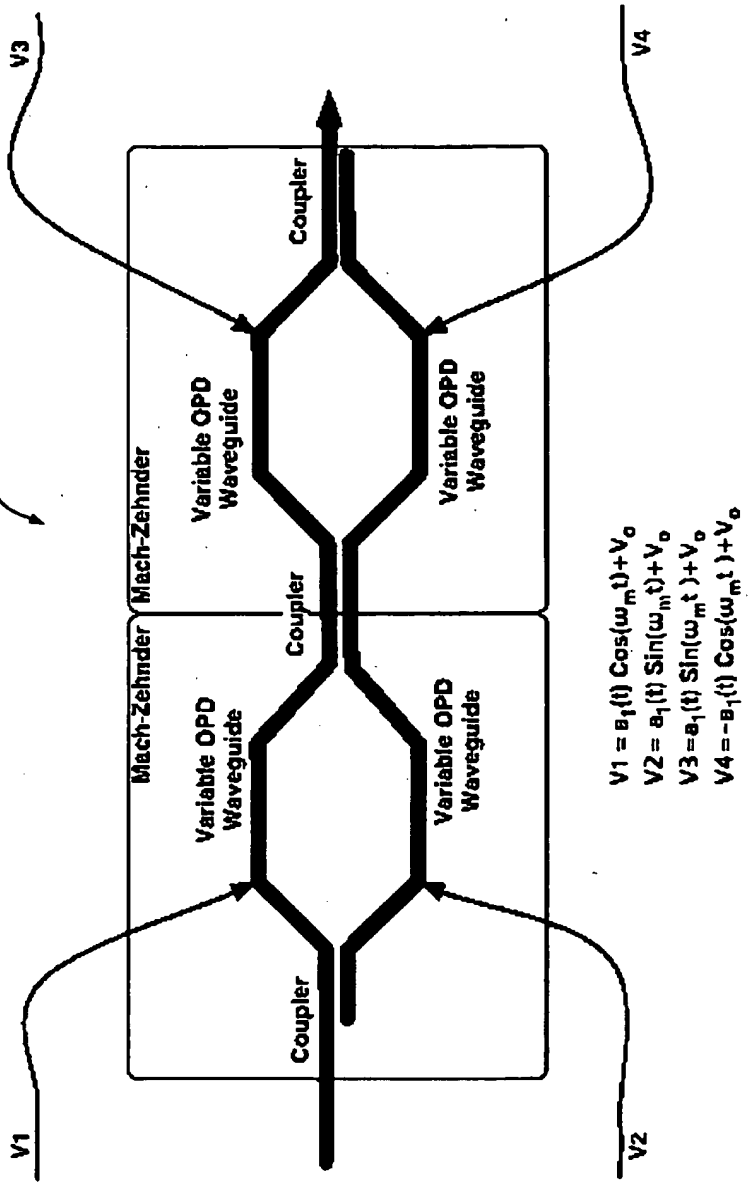

FIG. 10

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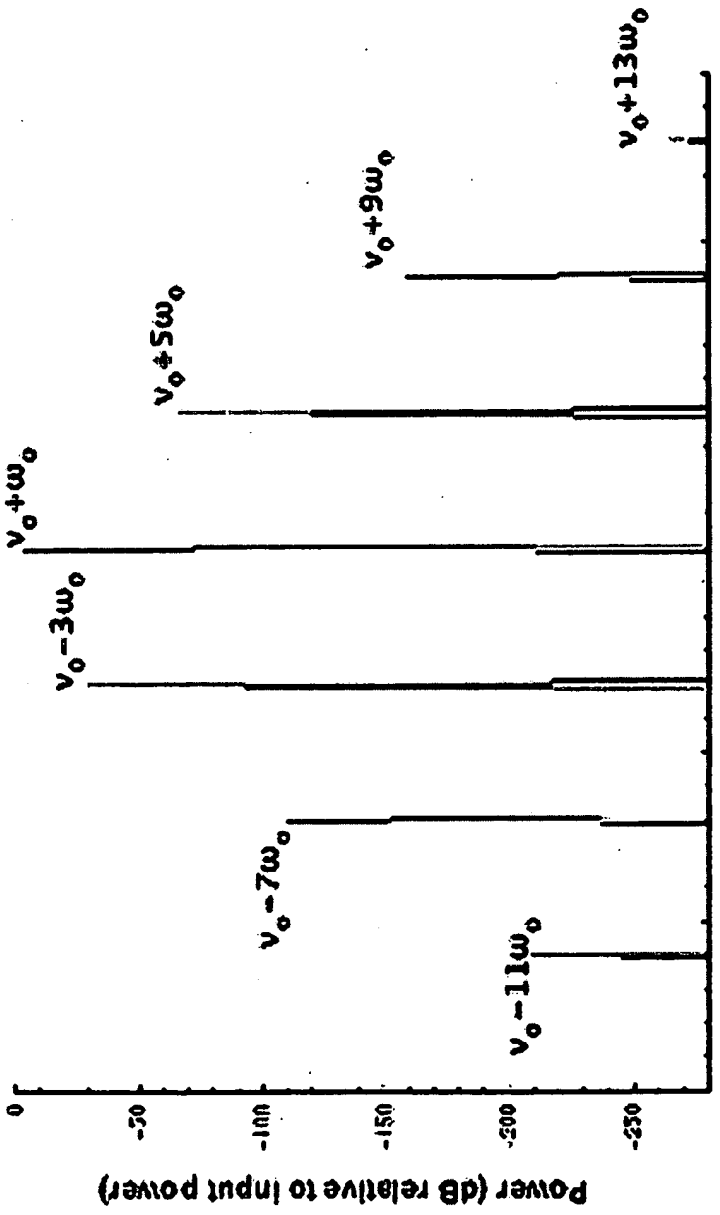

FIG. 11

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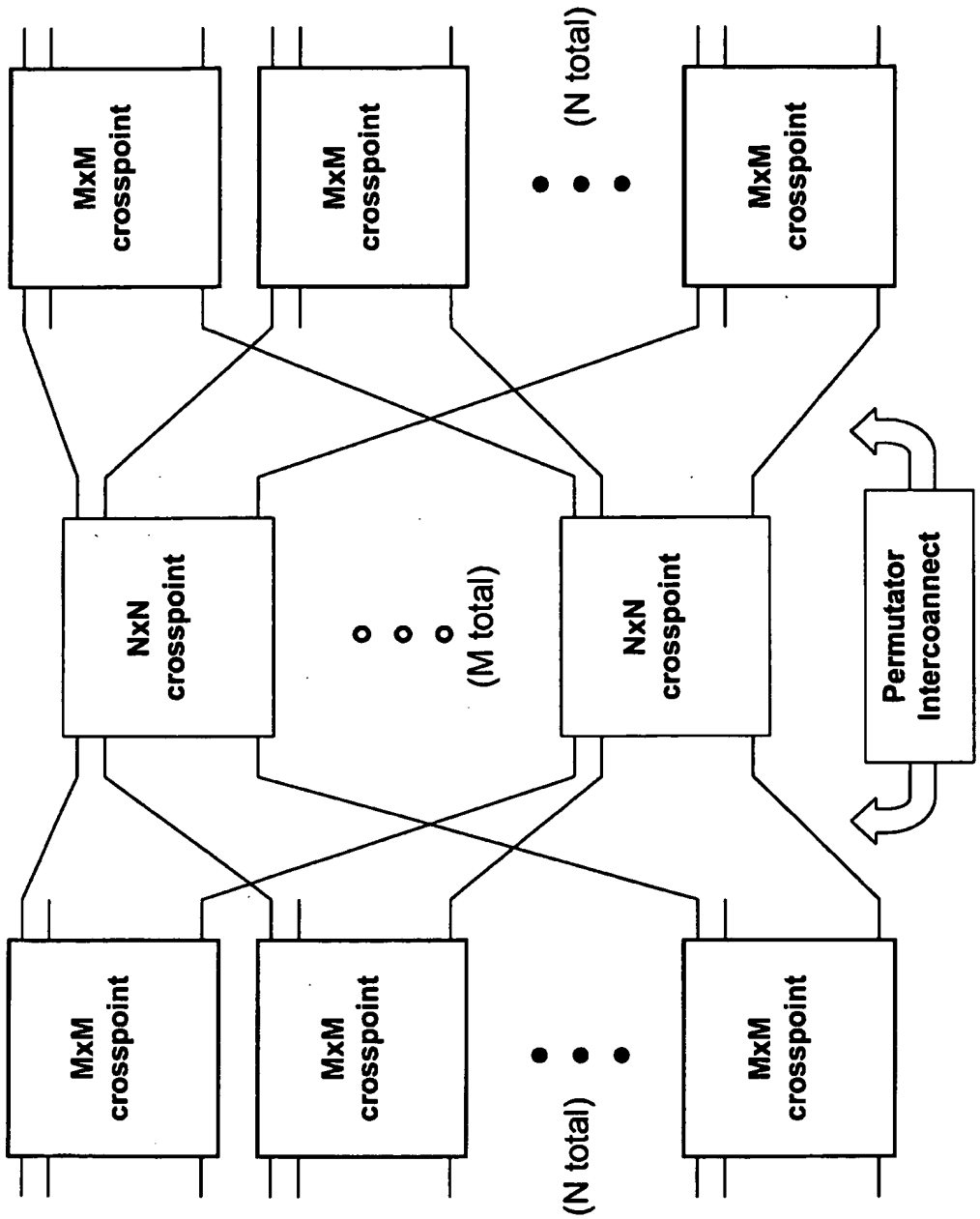

FIG. 12

REPLACEMENT SHEET

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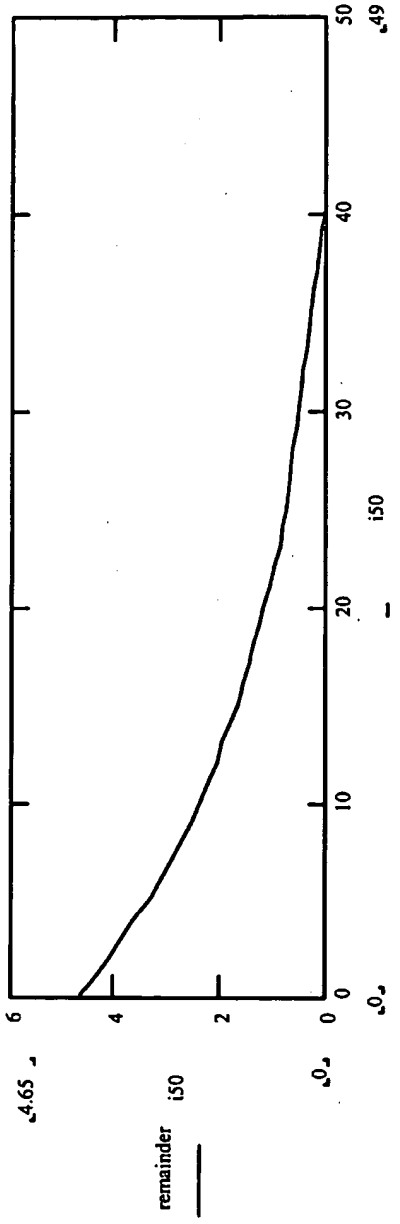

FIG. 14

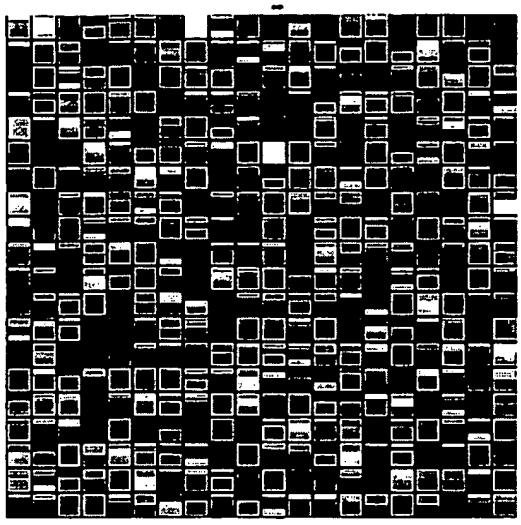

FIG. 15

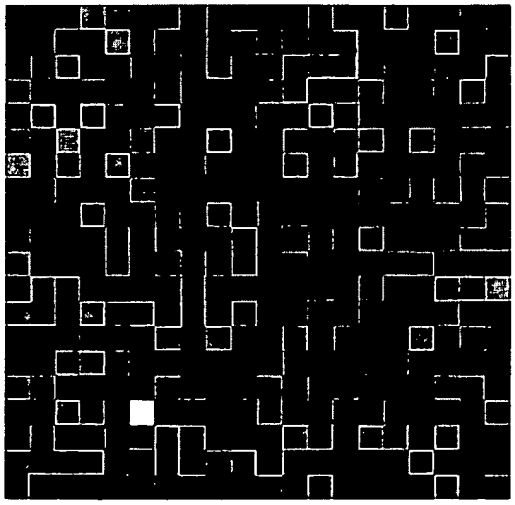

FIG. 13

sk 4/19/2007 REPLACEMENT SHEET

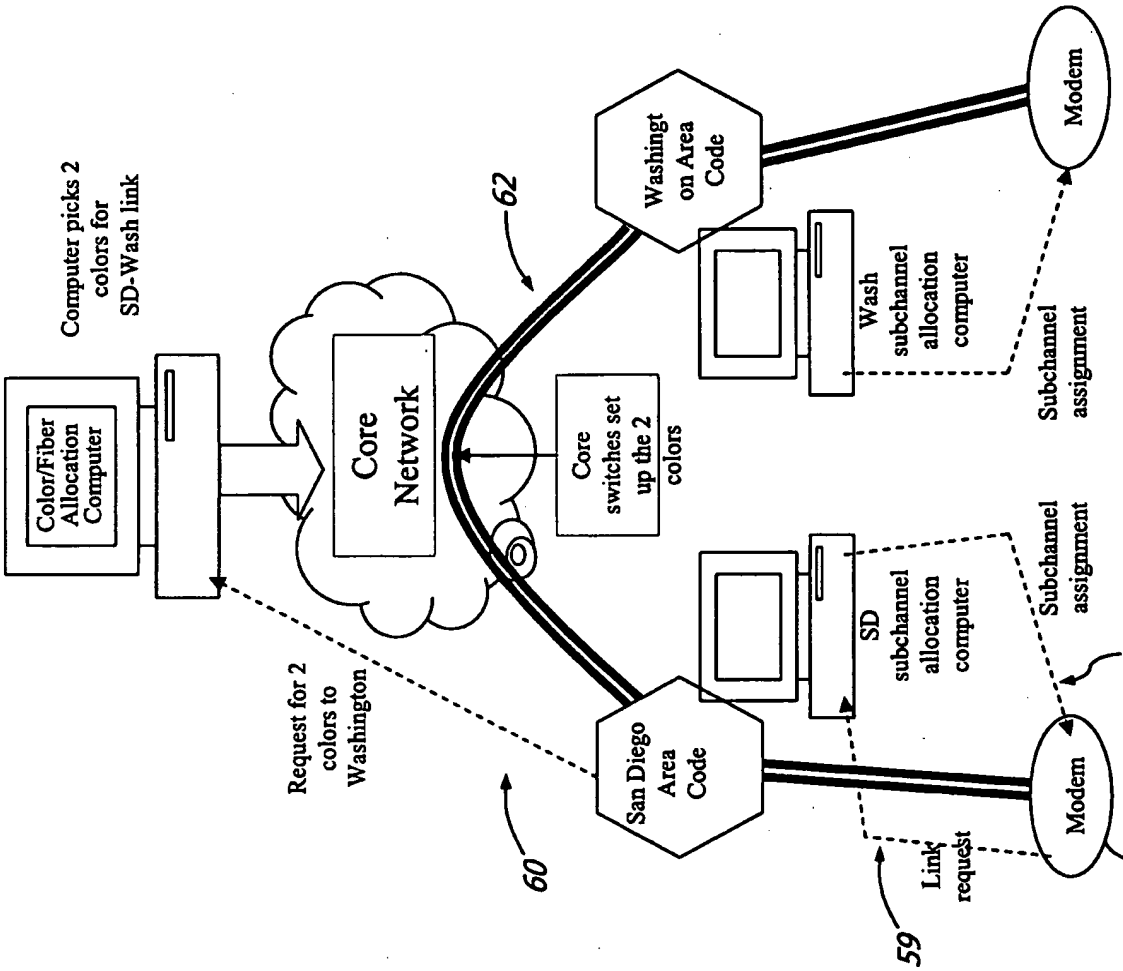

FIG. 16